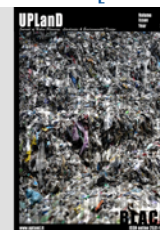


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ARCHAEOLOGICAL HERITAGE AND ANTHROPIZED CONTEXTS: LIMITS AND OPPORTUNITIES

Caterina Frettoloso

Department of Architecture and Industrial Design, University of Campania "Luigi Vanvitelli", IT

HIGHLIGHTS

- Cultural heritage is a non-renewable resource.
 - What makes the visit "dangerous" is not so much the presence of the users, but rather the lack of appropriate routes that can support them during their visit.
 - Archaeological heritage is not a "reserve" that is separated from the context. It is necessary to reduce the gap that exists between everyday reality and the reality of the asset.
 - It is needed to select those goods that, not only individually but above "systematized" in range of thematic paths, are important in relation to the story which we want to stage.
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ABSTRACT

The highly stratified nature of Mediterranean cities, if on the one hand contributes to the construction of an image with remarkable historical and artistic values, on the other it makes their reading and understanding more complex. The relationship between archaeology and the context, especially urban, has many variables and problems related both to the mode of use of the user/citizen as well as the need for transformation and growth of the city itself.

Archaeological heritage is not a sort of "reserve" that is separated from the context. On the contrary, it is necessary to work to reduce the gap that often exists between everyday reality and the reality of the asset, the result of years of isolation policies.

This contribution, from the research-project experiences matured by the author, proposes an hypothesis of "enriched" path in which cultural heritage, in particular archaeological, are put to system with the context of belonging. The sustainable use of cultural resources and the concept of "selecting" the most significant goods in relation to the path to be realized, are the main ideas of the proposed considerations as well as Accessibility, comfort and safety concepts of the visit are the strategic points of a fruition project to be developed starting from the user's needs and in compliance with the environmental and technological compatibility of the asset to be protected.

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1. CULTURAL HERITAGE: OPEN ISSUES

Recovering the identity of a territory through the valorisation of its cultural heritage is one of the main objectives of current European cultural tourism policies. From a methodological and operational point of view, this results in diversified approaches that are constructed starting from the individual realities in which we operate in order to promote the qualifying elements. The identification, not only of the episodes of particular interest but, in general, of those that characterize the specificity of a place, is considered the first step towards their protection: from the promotion of the artefact to its integration with the context. Integration that can be implemented both through the re-insertion of the artefact within a circuit of cultural and economic development as well as its “attendance”.

The use sets objectives and tools of a valorisation

process aimed at knowledge, in the specific case of archaeological heritage, it is usually difficult to interpret. The highly stratified nature of Mediterranean cities, if on the one hand contributes to the construction of an image with remarkable historical and artistic values, on the other it makes their reading and understanding more complex.

The archaeological heritage, which could define “diffused”, is often important pages in the history of a city or a territory while remaining, in most cases, incomprehensible to a non-specialist public (Fig. 1). The need to give it a name but, above all, to systematise these episodes with respect to a broader context, urban scale, for example, proposes innovative and diverse approaches.

The relationship between archaeology and the context, especially urban, has many variables and problems related both to the mode of use of the user/citizen as well as the need for transformation and growth of the city itself. It often occurs that poorer quality examples are not given the right



Figure 1: Entrance to the Colombario of Fusaro (Na). Source: photo by C. Frettoloso.

amount of attention, the appropriate protection policies and are not subject to a proper use. At best, when this does not occur, the conservation strategies seem to be more oriented to the isolation of the artefact rather than its concrete insertion into the cultural circuit of the specific context. In fact, the fence that does not even spare the archaeological heritage of particular interest, seems to be the main instrument for the protection of the artefact, thus stopping any form of spatial continuity, cultural and temporal, as well as with the context and the user (Fig. 2). It is therefore necessary to work not so much on the protection in itself but rather on the development of transformation methods of the territory within a sustainable and compatible perspective.

In order to prevent an inappropriate use of cultural resource (non-renewable resource), it must determine what are the conditions so that this heritage is not just put under protection in an institutional but also in a concrete way. Methodological apparatus capable of defining outcomes that result from the balanced composition of different variables involved must be prepared. These variables are closely related to the peculiarities of the object to preserve and enjoy. In this case, concerning the archaeological heritage, a type of good that, as Sandro Ranellucci (1996) carefully observed, “is identifiable with an complex monumental articulation, with a system of documents which, using current methods, stems from a rigorous stratigraphic investigation, with a complex structure in which not only the “presence”, but also inextricably to the

“absence” shall be assigned the role of a communication from the past”.

2. SYSTEMS FOR FRUITION: ACCESSIBILITY, COMFORT AND SAFETY

It is widely believed and “accepted” that a visit to an archaeological site can be a cause of its deterioration but the relationship has only partially been verified. What makes the visit “dangerous” is not so much the presence of the users, but rather the lack of appropriate routes that can support them during their visit. In fact, one of the main problems in archaeology is the need to rationalise the visit routes. From a purely architectural point of view, this results in crossing systems that possess some basic requirements, i.e., they do not interfere visually with the ruins, do not alter the subject and ensure continuity and clarity during the visit. Allowing the public to use an asset entails numerous archaeological interventions, often invasive, as well as the resolution of problems related to the musealisation of the site, the presence of protective systems, the safety and welfare of the users, the accessibility of the place and the exhibition. Accessibility, comfort and safety of the visit are the strategic points of a fruition project to be developed starting from the user’s needs and in compliance with the environmental and technological compatibility of the asset to be protected.

In addition, there are interrelated aspects that can-



a



b

Figure 2: Sacello of the Augustali (Bacoli, Na). (a) View from the street; (b) inside view. *Source: photos by C. Frettoloso.*

not be separated from the environmental features of the site, as it emerged in some cases study that I analysed. If on the one hand, the strong integration between the archaeological remains and the environmental context of natural beauty can make the site unique and attractive, on the other, it amplifies the difficulty in making it a place to visit with the conditions of comfort and, above all, safety.

An example of this delicate balance is the case of the Villa di Pollio Felice in Sorrento (NA), an impressive archaeological site overlooking the sea where the line between the site and the context is almost impossible to perceive.

In order to outline a problem reference framework aimed at the methodological definition of a project concentrating on the sustainable use of the area, the first element to focus on is the morphology of the site that is highly structured: it goes from the sea to the coast, crossing the archaeological area finally reaching an area of dense vegetation. From an architectural point of view, this naturalistic conformation poses some delicate design issues in relation to overcoming significant slopes, the more or less sinuous trend of the coast line to be followed or stayed away from, the ability to make the environmental complexity of the site visible and, in particular, the dual relationship of the archaeological asset with both the sea and the green area above. In the design phase, it would be desirable to establish a hierarchical system, identifying the archaeological and/or natural features that represent a kind of "priority to visit". The selected elements will form the focal points of the nodes or networks of the routes, whether museums and/or historic.

The presence/absence of an order of the elements to visit, as well as the presence/absence of routes designed specifically for the museum exhibition provides an opportunity to consider the most appropriate museum logic to adopt, identifying what degree of freedom to allow visitors. In fact, the museum routes, depending on whether they are arranged according to artistic or scientific criteria, assume a more or less "binding" role for the user. The notion that the visitor should be guided solely by the fascination of the ruins, from the suggestions, is not always desirable in a cultural project which has the aim of making the asset known.

Especially in a site like the villa of Pollio Felice, it is worth considering a strategy that, if on the one hand gives the public the opportunity to walk freely among the ruins, while on the other, guides it through the installation. Whatever the case, giving

"autonomy" to users is never an easy choice and, above all, is not devoid of design implications. On the contrary, as long as dangerous situations for the users and the protection of the asset, visitors should be provided with tools that allow them to interpret the space surrounding them. For example, the two spatialities that coexist in the archaeological areas should be distinguished: the "archaeological" and "museological". The remains are often found on the plane closer to that of the foundation, protruding from the ground level, at times, a few tens of centimetres. This implies a difficulty of perception of the same due to the fact that it is not easy to understand the architectural aspects, the spatiality, with visitors, spontaneously, searching for better, and not always safe, views. Many amateur images show visitors at the site of Villa di Pollio Felice, leaning over the rocky cliffs without any protective systems looking for new views.

There is the same difficulty when distinguishing the external areas from the internal ones, especially where there are no floors. When the walls or elements of the atria of the buildings are no longer able to evoke the architectural space of the body now reduced to a state of ruin, it becomes important to provide diversified modes of treatment of the soil in order to highlight those difficult to understand aspects, inserting, if compatible with the context, privileged points of view.

The inclusion of any system of delimitation, aimed at preventing a movement or, more simply, to allow it safely, needs to be verified for compatibility with the archaeological and environmental context starting from the architectural integration. In fact, looking at several small infrastructures currently present on the site, it is impossible not to make some considerations. If on the one hand, they clearly manifest their "provisional" and, in some way, "spontaneous" nature, clearly highlighting the objective difficulty of confronting an environment of great natural beauty as well as archaeology. The use of fences or "building-site" structures as well as walkways on stilts, highlights the actual complexity in the context of a dialogue with a delicate ecological and perceptive balance, requiring, therefore, a design approach of extreme methodological rigor. These initial considerations lead to an integrated approach for an responsible use that, starting from the archaeological context, it takes into account the environmental quality of the area according to a design logic that could be called an "interconnection" between the more sustainable microsystems.

3. BOUNDARY SYSTEMS AND ARCHAEOLOGICAL FRUITION

The relationship between archaeology and the context, especially the urban one, has many variables and problems related both to way of use of the user/ citizen as well as the needs of transformation and growth of the city itself. Less important, or simply less well known, examples are often not given the right amount of attention, the appropriate protection policies and properly used. At best, when this does not occur, the protection strategies seem to be more oriented to the isolation of the good rather than its inclusion in the cultural circuit of the specific context. "Our daily relationship with the archaeological remains, a real memento of our complexity and origin, is often vitiated by a series of difficulties (of road network, legislative, regulatory constraints, etc.) that puts us more and more often in the position of the excluded rather

er than in that of the owners. And the exclusion, as we all know, generates at best a distrust that quickly turns into indifference, at worst suspicion, antagonism and recrimination" (Aymonino, 2010). The logic of the enclosure identifies an attitude that was founded in the post-fascist period, when in a climate of rejection for demolition of the 1920-30s, it was deemed appropriate to protect the city of the past by blocking the urban transformations and separating it from the present (Ricci, 2006). The enclosure, that does not spare even the archaeological heritage of special interest, appears to be the main instrument for the protection of property, thus stopping any form of spatial, cultural and temporal continuity with both the context and with the user. It is therefore necessary to work not so much on the protection itself but rather on the development of the territorial transformation within a perspective of sustainability and compatibility. In fact "the fragility (apparent?) of

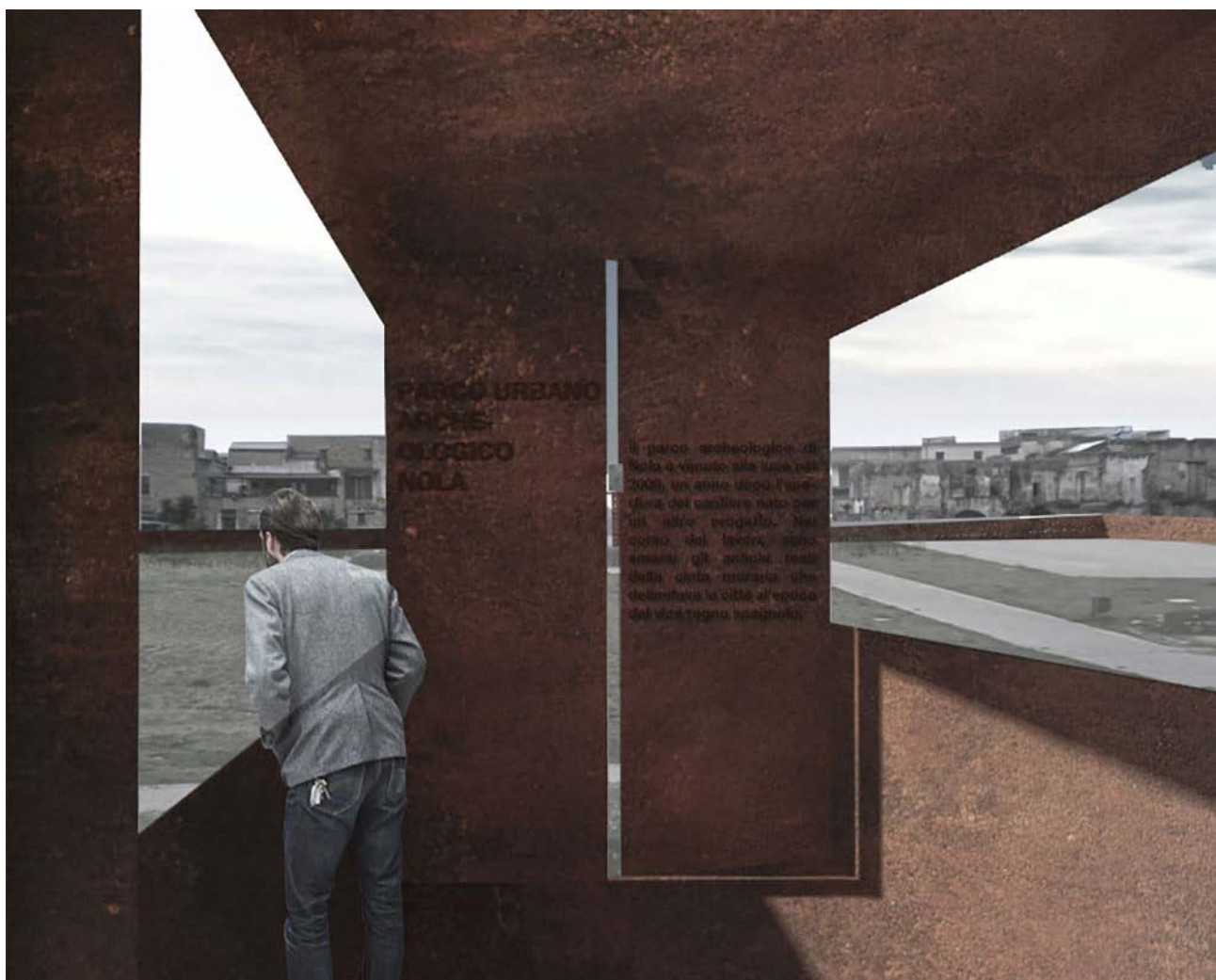


Figure 3: "Urban archaeology _ beyond limits". Source: G. Spiezia.



Figure 4: “Urban archaeology _ beyond limits”. Source: G. Spiezia.

structures and signs of attendance to be protected does not help with an autistic preservation that excludes the presence (and why not, the use) of our time, but with the constant flow of daily life through them” (Aymonino, 2010).

Archaeological heritage is not a sort of “reserve” that is separated from the context. On the contrary, it is necessary to work to reduce the gap that often exists between everyday reality and the reality of the asset, the result of years of isolation policies. Too often, the enclosure has been identified with the conservation intervention that, in some cases, concludes with the closing of a gate. If valorising an asset means recognizing its value by promoting its inclusion onto the cultural, spatial and economic circuit of its territory, it then is a contradiction to make archaeological sites isolated locations (Frettoloso, 2010).

The experience gained from the Technological Design theses as part of the Bachelor’s degree in Design and Communication move precisely in this direction, following an approach that takes into

account more variables that are mainly attributed to fruition-communicative, technological-environmental aspects as well as protection of the asset. In particular, the experiments carried out on the urban archaeological park of Nola, whose remains were discovered in 2009, involved the redesigning of the boundary system according to different user levels: on the one hand, the ability to relate perceptively with the asset from different points of view through “windows” and specially studied heights; and, the need to protect and define the archaeological area in relation to the dense surrounding urban fabric. The idea is to capture the attention of passers-by, limiting in some places the view of the archaeological area and offering them an open space where to stop (Fig. 3, 4, 5).

The experiment carried out on the area known as the Tomb of Agrippina in Bacoli (a theatre-nymphaeum part of a seaside villa that was destroyed) shares with the previous project, the search for a dialogue of many voices between the property to be protected, the user and the context, which in

this case is particularly striking. An analysis of the “boundaries” of the site revealed a complex situation since, especially compared to the adjacent houses, not only are they not clear but they also highlight the provisional nature with which they were conceived. The proposed boundary system allows the user to interact with it and with the context thanks to the type and sequence of the individual elements that make up the entire sys-

tem. Each one is left to the user through offering different “frames” from which to observe and photograph both the asset as well as the context. This element is configured as a whole, even as a graphic sign in relation to the skyline of coast without hiding the asset, in particular considering the view from the sea (Fig. 6, 7).

The design experiences described are also the result of a confrontation with the local authorities



Figure 5: “Urban archaeology _ beyond limits”. Source: G. Spiezia.

who gave the graduates an important support so that their proposals were more concrete and relevant to the real context. In fact, these proposals these proposals of enhancing the existing urban heritage, share a broader strategy based on the principles of sustainable tourism. A tourism that is “capable of matching, in the short and long term, the expectations of residents with those of the tourists without reducing the quality of the tourist experience and without damaging the social and environmental values of the area” (Cici, Schmidt di Friedberg, 1998).

The corollary could be to systematize the object in relation to its context, so that walking through our cities we do not feel as if they are “real non-places, in the sense that there are not any anthropological places concerning with living, but only with a distorted and fluctuating fruition, extraneous to the city life” (Ruggieri Tricoli and Sposito, 2004). It is widely believed and “accepted” that a visit to an archaeological site can be a cause of its deterioration but the relationship has only partially been verified. What makes the visit “dangerous” is not so much the presence of the users, but rather the lack



Figure 6: “Through the frame”. Source: S. Andreozzi.

of appropriate paths that can support them during their visit. The knowledge of the object must be made through its attendance. As Tracy Ireland has observed “conservation in situ enlists (...) archaeological remains in public memory work that is both allegorical and rhetorical, and the ‘up close and personal’ experience of the material past that they provide intensifies the experience of authenticity, perceived through the deep history of ruins and the sensuous qualities of the patina of age” (Ireland, 2016). In order not to transform archaeological use into a mere consumption, a fruition strategy is necessary that, starting from the identification of the users’ needs and potentialities and characteristics of the object, individualises a cultural path to follow, specifying the fielded instruments (Frettoloso, 2010).

4. THE URBAN-HERITAGE NETWORK: POTENTIAL FUTURE SCENARIOS

The construction of an urban network, made up of the open spaces system as well as the diffused cultural heritage, in particular archaeological, could have a key role in the regeneration strategies of Mediterranean cities in which there are intertwined problems related to ecological-environmental and technological-design issues. The nodes that make up the system, public open spaces and archaeological heritage, preserving the specific functions and meanings, will be connected in different ways in relation to the qualifying aspects of the individual areas as well as the requirements that guide the construction of the network itself. The idea of connecting these urban elements, characterized by specific design issues, comes from the identification of a common denominator as well as the role that both play as “sharing-spaces” of experiences, social or culture.

The idea is that of reciprocal help: the public open space (existing or planned) could provide support to the promotion of the cultural heritage (in particular, archaeological) which, in turn, benefitting from the functional integration could, through the public fruition, become an attractor element for the urban context, with the resulting consequences in positive terms from a conservative and management point of view.

“The challenge for the creation of high quality urban spaces is to combine all the requirements of the environmental and ecological needs of

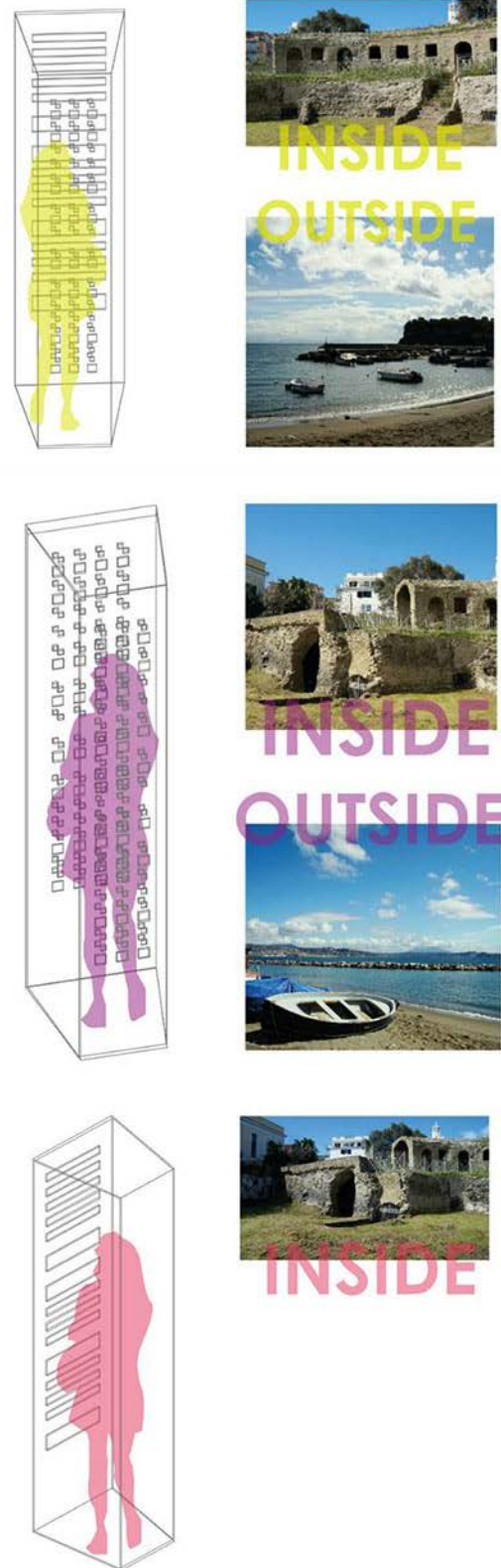


Figure 7: “Through the frame”. Source: S. Andreozzi.

the various user groups as well as the needs of a well-structured and participatory design in order to create well-organized and structured urban spaces. The end result should not consist of an anonymous "space" but a living "place", which has its own particular identity; not just functional areas, but carriers of meaning and values representative of all the groups of users" (Stiles, 2011). In addition, upon sharing the concept of sustainable use in the sense of the rational use of the cultural artefact, it is possible to construct a hypothesis of an integrated system in which the environmental, cultural and urban heritage is represented by the most significant elements, physical or virtual. This hypothesis re-proposes the delicate question of the relationship between the city and the cultural heritage in terms of "borders" and "compatibility" between the different functions. In particular, I am referring to the need to avert the danger of the "fence", i.e. the policy of delimitation, both physical and perceptual, in order to implement a form of protection (Ricci, 2006). A strategy that has been proven not winning and that, more importantly, tends to raise a barrier between the visitor/citizen and the heritage to be enjoyed. Upon further consideration, however, it is possible to senses that "the problem is not to eliminate the boundaries between archaeology [in general, cultural goods] and the city (...), but rather to be redefined in order to situate their border. A new awareness that sheds light among architects and planners: inspired by the ancient heritage, assuming the themes and issues as material for the project, and not only as a barrier that is opposed to it" (Manzione, 2000). The idea of a border, among other things, that also fits the concept of "diffused museum", which is a type of museum relating to the idea of a network that is being described.

In fact, the diffused museum, relating to separate elements in a limited area according to hierarchical relationships, attributes great importance to the context, to the territory where "the specific essence of the museum is concentrated" (Genovesi, 1999), and the system of paths that connect the individual elements. The connection systems fulfil the important role of restoring the apparent confusion in which it shows the landscape by establishing a hierarchy which gives a logic of the same through "various aspects: the topos, if the place where the objects were collected coincides with that of the community; the kronos, if the memory of the individual events is linked to that of collective events; genius, as the formation processes

of ideas involving the existence of the community through its generations" (Genovesi, 1999).

The idea of the network is profoundly based on the need to select the most significant episodes of both the cultural heritage as well as the open spaces of the city. One of the selection criteria could relate to the "functionality" of these areas compared to the urban system of relationships that are being built. In fact, such episodes, correctly set up, should meet the needs of the population with respect to the social, technological-functional and ecological-environmental aspects. The concept of selection is now the basis of the most innovative museum logics. It is no longer unthinkable to expose anything that has/possesses a museum. Similarly, in urban areas, it is necessary to work thematically, even when this means excluding some artefacts. The hypothesis developed within the research is heavily focused on the need to select those goods that, not only individually but above "systematized" in range of thematic paths, have the ability to "tell". The concept of selection is now the basis of the more innovative museum strategies. It is no longer unthinkable to expose anything that a museum has. Similarly, in an archaeological context, it is necessary to work according specific themes, making a choice not so much on the absolute value of the ruin to be selected, but rather on its importance in relation to the story which we want to stage.

Interesting the reflection made by Umberto Eco (1998) about the forms of the alternative museum. In the essay I'm referring to, starting from the concept of cultural deposit, the author makes a critical reading individualising a series of "risks" linked with the tendency of the traditional museum to create some objects-fetishes, to hide what it doesn't exhibit, not to make the hierarchies of value existing among different objects clear, to abound with information making "enjoyable not any objects but some sequences" (1998, p.30). However, there are some alternatives in respect of these traditional forms of layout; in many museums innovative ways of fruition are experimented that U. Eco himself brings back to some theoretical typologies of "alternative museum" that can find, in their integration and fusion, interesting exhibit solutions for the user.

I find particularly pertinent the "didactic museum to synecdoche" as alternative to the pursued methodological approach. In my opinion, it constitutes the most innovative form of museum, "it is focused on an only work or object, we get to,

through a path that gives, in various way, all the necessary information to understand the work or the object in question" (Eco, 1998: 30). The unique work can vary, or it would be interesting that the museum exhibited its works in rotation, elaborating a specific cultural project each time and using the non-selected material, in a consistent way with the layout in order to introduce and explain better the main object of the exhibition.

Therefore, in the circuit of public open spaces, of appropriately selected cultural nodes, may constitute grounds for enrichment on several fronts absolving, in whole or in part, also explicitly social functions, such as stopping/meeting. Considering the ideas in terms of the use and conservation of archaeological heritage, of which the first, the idea that part of its aims is the identification of a first level of open spaces in which to overlay a second layer made from cultural heritage so that the functions and values they represent can find a form of integration oriented towards the optimization of the resources available: maximizing the contribution of the individual elements/areas of the system, contributing to the improvement of urban quality and valorisation of existing heritage.

It is worth evaluating, on a case-by-case basis, from which sub-system to start in relation to the status quo (e.g., presence of open spaces with a strong and specialised identity, or heritage already part of a development process, etc.). This, in fact, will be assigned to "public spaces" rather than to "archaeological and cultural heritage", a greater weight into the design, especially in the setting goals, reducing the variables involved. In order to structure the relationships system (network model) which will later find different final configurations, it is useful, from a methodological point of view, to identify a set of guiding criteria that enable the designer to make meta-design choices. In this first phase of the research, the criteria mainly relate to: the closeness/distance between two or more selected nodes (open spaces and archaeological heritage); the level of functional integration (in relation to the dependence, in functional terms, between two or more areas); connection mode (physical and/or perceptual); the fruition of the users (both in individual nodes as well as during both the path that connects them). The various configurations of the network derived from it, will, therefore, be strongly influenced not only by the

weight that has been assigned to the two sub-systems ("public space" and "cultural heritage") but, also, by the type of public open space (existing or free area to be designed) as well as the type of public use of the heritage (open/closed area, presence/absence of a controlled access, etc.).

It is worth highlighting that this approach could be used for the realisation of an "enriched" path whose organizational logic, as well as the support tools and technological systems, are directed at recovering a sort of "tranquillity during the visit" of cultural heritage. Even a user who quickly or carelessly passes through these spaces with little motivation could, with proper precautions, enjoy a place of "knowledge", even if received with "lightness".

5. CONCLUSIONS

A sustainable approach to cultural heritage means, first of all, a rational use of the cultural resource and requires us to move the interest from the protection to the controlling of the transformations of the territory. In terms of protection, this means considering the public fruition of a good as the main purpose of a conservation process.

This paper tries to go beyond the communicative component of the use, i.e. all those aspects which, when properly integrated into "extended" accessibility help to make the archaeological ruins comprehensible, readable, and therefore fully accessible. Sharing the concept of sustainable use in the sense of the rational use of the cultural artefact, it is possible to construct a hypothesis of an integrated system in which the environmental, cultural and urban heritage is represented by the most significant elements, physical or virtual. In fact, the research hypothesis of an "enriched" path highlights the need to select those goods that, not only individually but above "systematized" in range of thematic paths, have the ability to "tell".

It is understood that the premise of the implementation of any strategy to upgrade and enhance the existing urban heritage is the critical knowledge of the places in which they must operate, the active participation of all public and private entities involved and, not finally, a careful economic planning of interventions to be carried out.

REFERENCES

- Aymonino, A. (2010). Recinti versus Esperienza. *Iuav - Archeologia e contemporaneo*, 81/2010.
- Cici, C., & Schmidt Di Friedberg, P. (1998). Nuove forme di turismo: definizioni e glossario. In M. Bianchi (Ed.), *L'arte del viaggio – ragioni e poesia di un turismo sostenibile*. Milano, IT: MC Editrice.
- Eco, U., Zeri, F., Piano, R., & Graziani, A. (1998). *Le isole del tesoro*. Venezia, IT: Electa.
- Frettoloso, C. (2010). *Dal consumo alla fruizione: tecnologie innovative per il patrimonio archeologico*. Firenze, IT: Alinea editrice.
- Genovesi, E. (1999). Simulazioni per un progetto: il museo diffuso e il sistema museale. In *Musei e Parchi archeologici, Quaderni del Dipartimento di Archeologia e Storia delle Arti sezione archeologica* (pp.105-143). Firenze, IT: University of Siena.
- Ireland, T. (2016). Up Close and Personal: Feeling the Past at Urban Archaeological Sites. *Public History Review*, 23, 43-55. doi: 10.5130/phrj.v23i0.5332
- Manzione, L. (2000). Archeologia e città: la trasgressione dei limiti. Intervista a Yannis Tsiomis. Retrieved from <http://architettura.it>
- Ricci, A.M. (2006). *Attorno alla pietra nuda. Archeologia e città tra identità e progetto*. Roma, IT: Donzelli.
- Ruggieri Tricoli, M. C., & Sposito, C. (2004). *I siti archeologici. Dalla definizione del valore alla protezione della materia*. Palermo, IT: Flaccovio editore.
- Ranellucci, S. (1996). Strutture protettive e conservazione dei siti archeologici. In *Opus saggi 5*. Pescara, IT: Carsa edizioni.
- Stiles, R. (2011). Manuale per spazio urbano, Progetto “UrbSpace”. Retrieved from <http://urbanspace.rec.org/files/Joint-Strategy-in-Italian.pdf>, 5-6.